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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/721,488	11/25/2003	Shiping Guo	EMCORE 3.0-081	6052
530	7590	08/29/2005	EXAMINER	
LERNER, DAVID, LITTENBERG, KRUMHOLZ & MENTLIK 600 SOUTH AVENUE WEST WESTFIELD, NJ 07090			TRAN, MINH LOAN	
			ART UNIT	PAPER NUMBER
			2826	

DATE MAILED: 08/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/721,488

Applicant(s)

GUO ET AL.

Examiner

Minh-Loan T. Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 June 2005.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-92 is/are pending in the application.
4a) Of the above claim(s) 10-18 and 25-92 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-9 and 19-24 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 25 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4/1/05; 12/29/03
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-33 and 68-80 in the reply filed on 6/13/2005 is acknowledged.

Further, applicant's election without traverse of species I shown in Fig. 1, claims 1-9 and 19-24. Therefore, claims 10-18 and 25-92 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim.

Oath/Declaration

2. The oath or declaration filed on 11/25/2003 is acceptable.

Drawings

3. The drawings filed on 11/25/2003 are acceptable.

Information Disclosure Statement

4. The information disclosure statements filed 04/01/2005 and 12/29/2003 have been considered.

Claim Objections

5. Claim 9 is objected to because of the following informalities:
Claim 9 is redundant of claim 7.
Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 19-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feltin et al. (Stress control in GaN grown on silicon (111) by metalorganic vapor phase epitaxy, Applied Physics Letters, Vol. 79, No. 20, Nov. 2001).

Figure 1 of Feltin et al. discloses a semiconductor structure comprising a silicon substrate; an AlN nucleation layer overlying a surface of the silicon substrate; a buffer structure including a first superlattice and a second superlattice of plurality of nitride-based semiconductor of different compositions (GaN/AlN) and an GaN intermediate layer is between first superlattice and a second superlattice; an operative structure of GaN-based semiconductors overlying the buffer structure. Note page 3230 of Feltin et al.

Feltin et al. does not disclose the nucleation layer has a polycrystalline structure. However, it would have been obvious to one of ordinary skill in the art to form the AlN nucleation of Feltin et al. having polycrystalline structure because such crystalline structure of AlN is conventional in the art for forming the buffer layer for reducing the lattice mismatch between the silicon substrate and the GaN-based semiconductor structure overlying the silicon substrate.

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dadgar et al. (Thick, crack-free blue light emitting diodes on Si(111) using low-temperature AlN interlayers and in situ Si_xN_y masking, Applied Physics Letters, Vol. 80, No. 20, May 2002) in view of Feltin et al. (Stress control in GaN grown on silicon (111) by metalorganic vapor phase epitaxy, Applied Physics Letters, Vol. 79, No. 20, Nov. 2001).

Page 3670 of Dadgar et al. discloses a semiconductor structure comprising a silicon substrate; a layer of aluminum directly overlying a first surface of the silicon substrate; an AlN nucleation layer overlying a surface of the silicon substrate; a buffer structure including a first LT-AlN layer, a GaN layer and a second LT-AlN layer; an operative structure of GaN-based semiconductors overlying the buffer structure.

Dadgar et al. does not disclose the buffer layer including one or more superlattices. However, figure 1 and page 3230 of Feltin et al. disclose a buffer structure overlying the AlN nucleation layer including a first superlattice and a second superlattice of plurality of nitride-based semiconductor of different compositions (GaN/AlN) and an GaN intermediate layer is between first superlattice and a second superlattice; an operative structure of GaN-based semiconductors overlying the buffer structure.

Therefore, it would have been obvious to one of ordinary skill in the art to replace the buffer structure of Dadgar et al. by the buffer structure including a first superlattice and a second superlattice of plurality of nitride-based semiconductor of different compositions (GaN/AlN) and an GaN intermediate layer is between first superlattice and a second

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superlattice such as taught by Feltin et al. in order to decrease the stress so that preventing the crack formation in an overgrown GaN-based semiconductor layers.

Dadgar et al. and Feltin et al. do not disclose the nucleation layer has a polycrystalline structure. However, it would have been obvious to one of ordinary skill in the art to form the AlN nucleation of Dadgar et al. and Feltin et al. having polycrystalline structure because such crystalline structure of AlN is conventional in the art for forming the buffer layer for reducing the lattice mismatch between the silicon substrate and the GaN-based semiconductor structure overlying the silicon substrate.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minh-Loan T. Tran whose telephone number is (571) 272-1922. The examiner can normally be reached on Monday-Friday 9:00 AM-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mlt
08/2005



Minh-Loan T. Tran
Primary Examiner
Art Unit 2826